REMARKS

INTRODUCTION:

In accordance with the foregoing, the claims have been retained in their present form. No new matter is being presented, and approval and entry are respectfully requested.

Claims 1 and 3-34 are pending and under consideration. Claims 18-34 have been allowed. Reconsideration is respectfully requested.

WITHDRAWAL OF FINALITY OF THE REJECTION OF THE LAST OFFICE ACTION:

Applicant thanks the Examiner for withdrawing the finality of the rejection of the last Office Action to allow Applicant the opportunity to present patentability arguments in view thereof.

REJECTION UNDER 35 U.S.C. §102:

In the Office Action, at pages 2-4, claims 1, 3, 7, and 9 were rejected under 35 U.S.C. §102(b) as being anticipated by Noda et al. (USPN 6,229,833; hereafter, Noda). This rejection is traversed and reconsideration is requested.

It is respectfully submitted that Noda does not satisfy the claimed structural limitations at least because Noda does not teach or suggest "performing proportional-integral processing on the error voltage" as is recited in independent claim 1, and similarly in independent claim 9, of the present invention. In contrast, Noda teaches an automatic current control circuit that performs automatic current control in such a manner that the laser diode current attains a set current value (see Abstract, Noda), wherein the automatic current control circuit, for example, may be implemented as illustrated in FIGs. 7, 8, 11 and 12, element 16 of Noda. That is, Noda teaches a circuit structure that performs automatic current control of a laser diode not utilizing proportional -integral processing, in contrast to the present invention, which recites on page 5, paragraph [0019]:

> [0019] FIG. 2 is a block diagram showing a printer controller 21 including an automatic power control module 23 for a laser diode, according to an aspect of the present invention, and associated peripheral elements. The printer controller 21 is an integrated circuit including an engine processor module 22 and the automatic power control module 23. The engine processor module 22 controls an entire operation of a printer engine 24. <u>The automatic power control module 23 automatically controls an output power of a laser diode 25, which is sensed by a sensor 26, to minutely approach a target value using proportional-integral control</u>. The laser diode 25 is included within a laser scanning unit (not shown). (emphasis added)

That is, the present invention utilizes a proportional-integral control, which is generally referred to as a control algorithm that combines the proportional (proportional response) and

integral (reset response) control algorithms, which is often called a two-mode control. Reset response tends to correct the offset resulting from proportional control. Noda does not teach or suggest a proportional-integral control.

With respect to claim 3, the Examiner submits that Noda teaches "a compensated control voltage." However, simply utilizing a compensated control voltage does not teach or suggest utilizing a proportional-integral control, which specifically combines proportional and integral algorithms to effect a two-mode control, as is accomplished in the present invention. Hence, Noda does not satisfy the claimed structural limitations of claim 3.

It is respectfully submitted that the terminology "computer" is not recited anywhere in Noda. Hence, it is respectfully submitted that Noda does not teach or suggest "a computer readable medium having embodied thereon a computer program for automatically controlling an output power of a laser diode," as is submitted by the Examiner with respect to claim 7. Hence, Noda does not satisfy the claimed structural limitations of claim 7.

Clalim 9 of the present invention includes "a control voltage generation unit performing proportional-integral processing on the error voltage provided from the error voltage generation unit to generate an effective control voltage," which is not taught or suggested by Noda. Hence, Noda does not satisfy the claimed structural limitations of claim 9.

Hence, it is respectfully submitted that independent claims 1, 7 and 9 are not anticipated under 35 U.S.C. §102(b) by Noda et al. (USPN 6,229,833). Since claim 3 depends from claim 1, claim 3 is not anticipated under 35 U.S.C. §102(b) by Noda et al. (USPN 6,229,833) for at least the reasons independent claim 1 is not anticipated under 35 U.S.C. §102(b) by Noda et al. (USPN 6,229,833).

REJECTION UNDER 35 U.S.C. §103:

In the Office Action, at pages 5-6, claims 4, 8, and 10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Noda et al. (USPN 6,229,833; hereafter, Noda) in view of Woodley (US Patent Application No. 2003/0179787; hereafter, Woodley). The reasons for the rejection are set forth in the Office Action and therefore not repeated. The rejection is traversed and reconsideration is requested.

Independent claim 8 of the present invention discloses "A computer readable medium having embodied thereon a computer program for automatically controlling an output power of a laser diode." Woodley discloses in paragraphs [0029] and [0062], recited below for the Examiner's convenience:

[0029] According to yet another general aspect of the present invention, computer readable storage media stores code which causes a host processor to control a cavity length of a laser assembly in a telecommunication system. The laser assembly comprising a laser gain medium is optically coupled to a waveguide segment, the waveguide segment comprised of electro-optical material and a plurality of electrodes adjacent a surface of the waveguide segment. The code causes the host processor to receive a required operating frequency of the laser assembly. The code measures an actual operating frequency of the laser assembly and receives data from a sensor, the sensor being configured to measure a temperature of the laser assembly. The code selectably energizes each of the electrodes based on the data from the sensor, such that the cavity length of the waveguide segment is controlled. (emphasis added)

[0062] At constant temperature and wavelength, all the terms in the above equation are substantially constant with the exception of $L_{exTM}(n_{TM}-n_{TE})$. Since L_{exTM} can be chosen by selecting the electrodes that are to be activated (thus controlling the physical location of the mode converter), it is possible to directly control the optical length of the cavity. As discussed previously, both the physical length of the materials in the optical cavity and the index of refraction of the materials in the optical cavity are a function of temperature. Using a computer (to be described below) to schedule L_{exTM} as a function of measured temperature and laser output, it is possible to compensate for the other terms in the above equation, thereby ensuring single mode operation. Thus, by electrically shifting the location of electrooptic index perturbations, it is possible to control the optical length of a laser cavity. This control may be used to compensate for temperature variations, thereby eliminating the need for thermal control to prevent mode hopping in lasers. (emphasis added)

Hence, Woodley teaches using computer readable storage media to store a computer program for directly controlling the optical length of the optical cavity and controlling a temperature thereof. Woodley does not teach or suggest the present claimed invention.

The only mention of "integral" in Woodley is in paragraph [0018], recited below for the convenience of the Examiner:

[0018] One method of controlling cavity length, and thereby preventing mode hopping and controlling the absolute frequency of the Fabry-Perot modes, is through active temperature control of the materials in the laser cavity. One method of controlling the temperature of DWDM semiconductor diode lasers is via a temperature sensing thermistor, a proportional integral derivative (PID) feedback control law, and a thermo-electric cooler (TEC) temperature actuator, although different choices for sensors, control laws, and actuators are clearly possible. Temperature control may be used to maintain a constant effective optical cavity length, for example laser devices using a rare earth ion (such as neodymium) doped into a crystalline host material as the active medium.

Clearly, Woodley is utilizing a PID controller, not a PI controller, to control a thermo-electric cooler (TEC) temperature activator and thus to control a temperature of a DWDM diode laser, *not to compensate an error voltage for application to the laser diode, thus generating an effective control voltage*, as is disclosed by independent claim 4, and similarly by independent

claims 8 and 9, of the present invention. Hence, Woodley teaches away from the present claimed invention.

It is respectfully submitted that, with respect to claims 4, 8 and 9, Noda does not disclose the claimed invention except for the analog to digital converter and digital to analog converter, as is submitted by the Examiner. Noda does not disclose "performing proportional-integral processing on the error voltage to generate a compensated control voltage" that is utilized to generate an effective/compensated control voltage as is disclosed in independent claim 4, and similarly in claim 9 of the present invention. Noda does not disclose "A computer readable medium having embodied thereon a computer program for automatically controlling an output power of a laser diode," as is recited in claim 8 of the present invention.

Hence, even if combined, Noda and Woodley do not teach or suggest independent claims 4, 8 and/or 9 of the present invention, and independent claims 4, 8 and 9 of the present invention are submitted to be patentable under 35 U.S.C. §103(a) over Noda et al. (USPN 6,229,833) in view of Woodley (US Patent Application No. 2003/0179787). Since claim 10 depends from independent claim 9, claim 10 of the present invention is patentable under 35 U.S.C. §103(a) over Noda et al. (USPN 6,229,833) in view of Woodley (US Patent Application No. 2003/0179787) for at least the reasons independent claim 9 of the present invention is patentable under 35 U.S.C. §103(a) over Noda et al. (USPN 6,229,833) in view of Woodley (US Patent Application No. 2003/0179787).

ALLOWABLE SUBJECT MATTER:

In the Office Action, at page 6, the Examiner objected to claims 5, 6, and 11-17 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant thanks the Examiner for her careful review of claims 5, 6, and 11-17. However, in view of the arguments submitted above, Applicant respectfully submits that claims 5, 6 and 11-17 are in allowable form.

In the Office Action, at page 6, the Examiner allowed claims 18-34.

Applicant thanks the Examiner for her careful review and allowance of claims 18-34.

CONCLUSION:

In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot, and further, that all

pending claims patentably distinguish over the prior art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance which action is earnestly solicited.

If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited by the Examiner contacting the undersigned attorney for a telephone interview to discuss resolution of such issues.

If there are any underpayments or overpayments of fees associated with the filing of this Amendment/Response, please charge and/or credit the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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